REMARKS

Claims 1-3 and 5-48 are pending in this application. By this Amendment, claims 38 to 44 are amended solely to correct claim dependencies. These amendments do not narrow the scope these claims would have had originally had the correct dependencies been provided. Applicants thank the Examiner for the indication that claims 35, 36, 46 and 48 contain allowable subject matter.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration; and (c) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary to correct claim dependencies. Entry of the amendments is thus respectfully requested.

The Office Action rejects claims 1-3, 5-34, 37-45 and 47 under 35 U.S.C. §103(a) as allegedly unpatentable over Kalinina et al., "A 'Core-Shell' Approach to Producing 3D Polymer Nanocomposites", Macromolecules, Vol. 32 (1999) pp. 4122-4129 (Kalinina), in view of U.S. Patent 4,948,695 to Matsushita et al. or U.S. Patent 5,013,629 to Sekine et al. Applicants respectfully traverse this rejection.

Claim 1 sets forth a method for storing information using a three-dimensional optical memory storage device, the method comprising subjecting a nanocomposite to irradiation. Claims 45 and 46 set forth similar methods. Claim 15 sets forth a matrix of particles where the particles comprising a liquid core resin containing at least one photosensitive compound, an inner shell resin encapsulating the liquid core, and an outer shell resin encapsulating the core resin and the inner shell resin, where the outer shell resin forms a continuous phase of

the matrix, and the particles are arranged in an array in the matrix. Claim 37 sets forth similar features.

Kalinina teaches a method for producing a three-dimensional polymeric nanocomposite, comprising a hard core and a soft inert shell in a polymer matrix. Specifically, Kalinina teaches that the glass transition temperature of the core is greater than the glass transition temperature of the shells. See Kalinina, fig. 1. In contrast to claims 1-3, 5-34, 37-45 and 47, Kalinina does not disclose, teach or suggest the use of a liquid core in the core-shell structures of a nanocomposite. At most, Kalinina teaches that cross-linking of the shell-forming polymer can produce core-shell particles with rigid shells and soft cores, which can later be dissolved to create a porous film. Thus, Kalinina teaches only a method of making an ordered nanocomposite of core-shell particles having hard cores or core-shell particles where the soft core has been dissolved and removed.

The Office Action asserts that Kalinina teaches fluid cores, at least in the dissolution of soft cores. But the dissolution of soft cores to remove the soft cores does not teach a fluid core structure, as set forth in claims 1-3, 5-34, 37-45 and 47. Rather, Kalinina teaches competely removing the soft core material. In other words, by teaching to remove the soft cores by dissolution, Kalinina teaches nanocomposites having hard cores or having no cores, i.e., removed cores. Kalinina clearly discloses that fluid cores should be removed and thus teaches away from a structure where the fluid core remains as an operative portion of the structure. Kalinina contains no motivation to substitute liquid core core-shell particles into its nanocomposite.

Additionally, Kalinina does not disclose, teach or suggest the method of irradiating the nanocomposite. At most, Kalinina alludes to the possibility of using nanocomposites such as those described in Kalinina for three-dimensional memory storage and to local

photobleaching. Kalinina itself does not teach the method of two-photon irradiation of claims 1 and 45, as is admitted by the Office Action at page 3.

Based on the teachings of Kalinina, one of ordinary skill in the art would, at most, find it obvious to try various methods of photobleaching. The features of selecting at least one individual particle of the nanocomposite and irradiating the at least one individual particle with two-photon irradiation, wherein, in response to the two-photon irradiation, at least one individual particle adjacent to the selected at least one individual particle is photobleached by no more than about 25%, as recited in claims 1 and 45, are nowhere suggested, disclosed or taught by Kalinina.

The Office Action asserts that the resolution of 0.3 μm taught in the specification at paragraph [0096] is specifically disclosed in Kalinina, at page 4124, "Studies of Film Morphology", and that "if the same resolution is used in at least one dimension, then at least one of the adjacent particles, above or below the target particle is not bleached more than the amount disclosed in the specification." Applicants respectfully disagree with this assertion.

As an initial matter, paragraph [0096] discloses that "a lateral resolution of ca. 0.3 μm was estimated." In contrast, the "Studies in Film Morphology" section of Kalinina discloses that the "vertical and the lateral resolutions were 0.3 and 0.7 μm, respectively." Kalinina, page 4124. That is, Kalinina discloses a vertical resolution of 0.3 μm and a lateral resolution of 0.7 μm. Applicants respectfully submit that Kalinina does not disclose the 0.3 μm lateral resolution described in the instant specification.

Further, Kalinina does not disclose, teach or suggest the method of two-photon irradiation of claims 1 and 45, as is admitted by the Office Action at page 3. Irradiating at least one individual particle of a nanocomposite with two-photon irradiation, wherein, in response to the two-photon irradiation, at least one individual particle adjacent to the selected

at least one individual particle is photobleached by no more than about 25% as recited in claim 1, is nowhere suggested, disclosed or taught by Kalinina. One of ordinary skill in the art would not have been motivated by Kalinina to select at least one individual particle of a nanocomposite; and irradiate that particle with two-photon irradiation, with the expectation that, in response to the two-photon irradiation, at least one adjacent particle in the direction of irradiation would be photobleached by no more than about 25%, as recited in claims 1-14 and 47, for at least the reasons that, unlike claims 1-3, 5-14, 45 and 47, Kalinina does not provide any teachings regarding the photobleaching of individual particles and/or regarding the extent that particles adjacent to target particles may be photobleached.

Thus, Kalinina alone does not disclose, teach or suggest all of the features of the nanocomposites or methods set forth in claims 1-3, 5-34, 37-45 or 47. Matsushita and Sekine, alone or in combination, cannot remedy these deficiencies of Kalinina.

Neither Matsushita nor Sekine disclose, teach or suggest the features of claims 1-3, 5-34, 37-45 and 47, outlined above as lacking in Kalinina. While Matsushita and Sekine both teach photo-curable microcapsules, neither Matsushita nor Sekine discloses, teaches or suggests a nanocomposite including a matrix array of particles having a liquid core resin containing at least one photosensitive compound surrounded by an inner shell resin and an outer shell resin that forms a continuous phase of the matrix as recited in independent claims 1, 15, 37 and 45, as well as allowed claims 35 and 46. Neither Matsushita nor Sekine contains any motivation to substitute the particles disclosed in either Matsushita or Sekine for the hard core core-shell particles of Kalinina. Moreover, Kalinina, as discussed above, teaches away from including fluid core microcapsules in its nanocomposite. Likewise, there is no motivation to substitute the particles of either Matsushita or Sekine into the Kalinina

porous film in which the soft cores have been removed. In addition, neither Matsushita nor Sekine contains any motivation to order their particles in a matrix array.

Additionally, with regards to claims 1-3, 5-14, 45 and 47, neither Matsushita nor Sekine discloses, teaches or suggests a method of photobleaching particles of a nanocomposite. Neither Matsushita nor Sekine, alone or in combination, discloses, teaches or suggests selecting individual particles within a nanocomposite and irradiating the selected individual particles, or irradiating the selected individual particles by using a two-photon irradiation of a wavelength effective for photobleaching the selected individual particles. Finally, the feature of irradiating at least one individual particle of a nanocomposite with two-photon irradiation, wherein, in response to the two-photon irradiation, at least one individual particle adjacent to the selected at least one individual particle is photobleached by no more than about 25%, as recited in claim 1, is also nowhere suggested, disclosed or taught by either Matsushita or Sekine.

Therefore, for at least the reasons outlined above, the combinations of Kalinina and either Matsushita or Sekine fail to teach, disclose or suggest all of the features recited in claims 1-3, 5-34, 37-45 or 47. Accordingly, the combinations of Kalinina, and either Matsushita or Sekine, cannot render claims 1-3, 5-34, 37-45 and 47 obvious under 35 U.S.C. §103(a). Withdrawal of the rejection of claims 1-3, 5-34, 37-45 and 47 as unpatentable over the combinations of Kalinina and either Matsushita or Sekine is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-3 and 5-48 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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